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Vordiplom: University of Goettingen (Germany), 1950
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Current Research Interests

I am currently engaged in the development of the theory of electromagnetic retardation and relativity. Perhaps the most important recently discovered aspect of the now evolving theory of electromagnetic retardation is that this theory leads to, and duplicates, many electromagnetic relations that are customarily considered to constitute consequences of relativistic electrodynamics. It is now clear that relativistic

electromagnetism and relativistic mechanics can be derived from Maxwellian electromagnetic theory and electromagnetic force relations via the theory of electromagnetic retardation without any postulates, conjectures, or hypotheses. As a result, the theory of relativity acquires a new mathematical and physical base which provides a previously unforeseen means for formulating, developing, and interpreting relativistic electromagnetism, relativistic mechanics, and relativistic gravitation.

    I am also working on the generalization of Newton's gravitational theory to time-dependent systems. By analyzing causal gravitational relations, I find that there is no objective reason for abandoning Newton's force-field gravitational theory in favor of a metric gravitational theory, and that Newton's theory must be developed and expanded to its logical and mathematical conclusion by making it compatible with the principle of causality and by making it applicable to time-dependent gravitational interactions. I base such an expansion, or generalization, on the existence of the second gravitational force field, the "cogravitational, or Heaviside's, field" (except for a numerical factor, the cogravitational field is the same as the "gravimagnetic" field of the general relativity theory). This field was first predicted by Oliver Heaviside in his 1893 article "A Gravitational and Electromagnetic Analogy" (click HEAVISIDE to see this remarkable but, regrettably, long-neglected article).

    The fundamental equations of the generalized Newton's theory are causal gravitational equations expressing time-dependent gravitational and cogravitational fields in the form of retarded integrals. For time- independent systems, these equations reduce to the conventional equations of the original Newton's theory. An important aspect of the generalized Newton's theory is that gravitational interactions involve not one single force of attraction but at least five different forces. Several consequences of the generalized Newton's theory are similar to certain consequences of Einstein's general relativity theory. An important consequence of the generalized Newton's theory is the possibility of the existence of stellar antigravitational mass configurations.

Selected Publications

A. Books

1. *Gravitation and Cogravitation: Developing Newton's Theory of Gravitation to its Physical and Mathematical Conclusion* (Electret Scientific, Star City, 2006).
2. *Electromagnetic Retardation and Theory of Relativity: New Chapters in the Classical Theory of Fields*, 2nd ed., (Electret Scientific, Star City, 2004).

3. *Causality, Electromagnetic Induction, and Gravitation: A Different Approach to the Theory of Electromagnetic and Gravitational Fields*, 2nd ed., (Electret Scientific, Star City, 2000).
4. *Electricity and Magnetism: An Introduction to the Theory of Electric and Magnetic Fields*, 2nd ed., (Electret Scientific, Star City, 1989).
5. *Scientific Graphics with Lotus 1-2-3: Curve Plotting, 3D Graphics, and Pictorial Compositions* (Electret Scientific, Star City, 1987).
6. *Electrostatic Motors: Their History, Types, and Principles of Operation* (Electret Scientific, Star City, 1973).
7. (**Editor of**) G. W. Francis, *Electrostatic Experiments: An Encyclopedia of Early Electrostatic Experiments, Demonstrations, Devices, and Apparatus* (Electret Scientific, Star City, 2005).

(The above books are available from the publisher -- Electret Scientific Co., P. O. Box 4132, Star City, WV 26504 -- and over the Internet from AMAZON.COM and from BARNES&NOBLE.COM).

B. Book Chapters

- "What is the Physical Nature of Electric and Magnetic Forces?" in *Has the Last Word Been Said on Classical Electrodynamics? -- **New Horizons***, A. E. Chubykalo, Ed., (Rinton Press, Paramus, 2004).
- "Does special relativity prohibit superluminal velocities?" in *Instantaneous Action at a Distance in Modern Physics: "Pro" and "Contra"*, A. E. Chubykalo, Ed., (Nova Science, New York, 1999).
- "Long-Lasting Electrization and Electrets" in *Electrostatics and its Applications*, A. D. Moore, Ed., (Wiley, New York, 1973).
- "Electrostatic Motors" in *Electrostatics and its Applications*, A. D. Moore, Ed., (Wiley, New York, 1973).

C. Encyclopedia Article

- "Maxwell's Equations" in *Macmillan Encyclopedia of Physics* (Macmillan, New York, 1996).

D. Some Journal Articles .

1. "Presenting electromagnetic theory in accordance with the principle of causality," Eur. J. Phys. **25**, 287-296 (2004).
2. "Torque exerted by a moving electric charge distribution on a stationary electric charge distribution," J. Phys. A: Math. Gen. **32**, 5305- 5314 (2002).

3. "Dynamic electric field maps," The Physics Teacher, **38**, 154-157 (2000)
4. "On the relativistic invariance of Maxwell's equations," Z. Naturforsch. **54a** 637-644 (1999).
5. "The Trouton-Noble paradox," J. Phys. A: Math. Gen. **32**, 3755- 3762 (1999).
6. "A relativistic paradox seemingly violating conservation of momentum law in electromagnetic systems," Eur. J. Phys. **20**, 39-44 (1999).
7. "On the experimental proofs of relativistic length contraction and time dilation," Z. Naturforsch. **53a**, 977-982 (1998).
8. "On Maxwell's displacement current," Eur. J. Phys. **19**, 469-470 (1998).
9. "Correct use of Lorentz-Einstein transformation equations for electromagnetic fields," Eur. J. Phys. **18**, 444-447 (1997).
10. "Is magnetic field due to an electric current a relativistic effect?" Eur. J. Phys. **17**, 180-182 (1996).
11. "Retardation and relativity: new integrals for electric and magnetic potentials of time-independent charge distributions moving with constant velocity," Eur. J. Phys. **17**, 258-264 (1996).
12. "Direct calculation of time dilation," Am. J. Phys. **64**, 812-814 (1996).
13. "Derivation of relativistic force transformation equations from Lorentz force law," Am J. Phys. **64**, 618-620 (1996).
14. "The nature of electromagnetic induction," Galilean Electrodynamics **6**, 83-86 (1995).
15. "Retardation and relativity: Derivation of Lorentz-Einstein transformations from retarded integrals for electric and magnetic fields," Am. J. Phys. **63**, 267-272 (1995).
16. "Retardation and relativity: The case of a moving line charge," Am. J. Phys. **63**, 454-459 (1995).
17. "Derivation of relativistic transformations for gravitational fields from retarded integrals," Galilean Electrodynamics **6**, 23-30 (1995).
18. "Gravitational field of a point mass moving with uniform linear or circular velocity," Galilean Electrodynamics **5**, 25-33 (1994).
19. "Direct calculation of the electric and magnetic fields of an electric point charge moving with constant velocity," Am. J. Phys. **62**, 79-85 (1994).
20. "Force exerted on a stationary charge by a moving electric current or by a moving magnet," Am. J. Phys. **61**, 218-222 (1993).
21. "Solutions of Maxwell's equations for electric and magnetic fields in arbitrary media," Am. J. Phys. **60**, 899-902 (1992).
22. "Direct calculation of electric and magnetic forces from potentials," Am. J. Phys. **58**, 625-631 (1990).
23. "Correct use of Maxwell stress equations for electric and magnetic fields," Am. J. Phys. **51**, 988-996 (1983).

24. "New method for calculating electric and magnetic fields and forces," Am J. Phys. **51**, 545-551 (1983).
25. "Electrets," (with D. K. Walker) Phys. Teach. **18**, 651-659 (1980).
26. "Water stream loop-the-loop," Am. J. Phys. **42**, 103-106 (1974).
27. "Cylindrical Electrets," Proceedings of the West Virginia Academy of Sciences **45**, 210-219 (1973).
28. "Volume charge in carnauba wax electrets," (with D. K. Walker) J. Appl. Phys. **44**, 3459-3464 (1973).
29. "Spherical carnauba wax electrets," (with Chang N. Y. Sun) in *Electrets, Charge Storage, and Transport in Dielectrics*, The Electrochemical Society, 462-473 (1973).
30. "Franklin electric motor," Am. J. Phys. **39**, 1139-1141 (1971).
31. "Operation of electric motors from atmospheric electric field," Am. J. Phys. **39**, 776-779 (1971).
32. "Electrostatic motors," (with D. K. Walker) Phys. Teach. **9**, 121-129 (1971).
33. "Semiclassical model of atomic interactions," J. Chem. Phys. **37**, 2123-2126 (1962).
34. "Demonstration of the electric fields of current-carrying conductors," Am. J. Phys. **30**, 19-21 (1962).
35. "Effect of the earth's magnetic field on the motion of an artificial satellite," Am. J. Phys. **27**, 344-348 (1959).

Awards

Sigma Xi Prize, 1956
Special Merit Award, 1971 AAPT Apparatus Competition
Third Prize, 1973 AAPT Apparatus Competition

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